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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,148	02/28/2002	Tatsuya Ohguro	220199US2S	4941

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EXAMINER

FARAHANI, DANA

ART UNIT PAPER NUMBER

2814

DATE MAILED: 07/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/084,148

Applicant(s)

OHGURO, TATSUYA

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8,10-13 and 15-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10-13 and 15-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 7, 8, 10, 13, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Stolmeijer et al., hereinafter Stolmeijer (U.S. 5,742,090).

Regarding claim 1, Stolmeijer discloses in figure 5 a semiconductor device comprising a semiconductor substrate 10; a first conductivity type well area 230 formed in a surface area of the semiconductor substrate; a plurality of element isolation areas 50 formed in the well area; a second conductivity type semiconductor layer, 30 and 40, formed at a first area of the well area which is isolated by the element isolation areas, the semiconductor layer configuring a first electrode of a capacitor; and a first conductivity type low resistance area 220 provided at a base portion of the well area, the low resistance area having a resistive value lower than that of the well area.

Regarding claim 2, Stolmeijer discloses a first conductivity type semiconductor layer, 83 and 84, formed in a second area of the well area which is isolated by the element isolation areas, the first conductivity type semiconductor layer configuring a second electrode of the capacitor.

Regarding claims 4, 10, and 15, see figure 5.

Art Unit: 2814

Regarding claim 7, the device in figure 5 comprises a semiconductor substrate 10; first conductivity type well 230 is formed in a surface area of the semiconductor substrate; a plurality of element isolation areas 50 are formed in the well area; a MOS transistor with gate 20 is formed in a first area of the well which is isolated by the element isolation areas and a first conductivity type 220 is provided at a base portion of the well area and having a resistive value lower than that of the well area.

Regarding claim 8, the device further comprises a first conductivity type semiconductor layer 83 formed in a second area of the well area which is isolated by the element isolation areas.

Regarding claim 13, the device comprises a semiconductor substrate 10; first conductivity type well area 230 formed in a surface area of the semiconductor substrate; a plurality of element isolation areas 50 formed in the well area; a second conductivity type base layer, 210, formed on the well area which is isolated by the element isolation areas, the well area configuring a first electrode 30 of a bipolar transistor; a first conductivity type second electrode 83 formed on the base layer; and a first conductivity type low resistance area 220 provided at the base portion of the well area, the low resistance area having a resistive value lower than that of the well area.

Regarding claim 16, the semiconductor device in figure 5 comprises a semiconductor substrate 10; a first well area 230 formed in a surface area of the semiconductor substrate; a second well area 130 formed in a surface area of the semiconductor substrate; an analog circuit, comprising the MOS transistor, the Bipolar Junction transistor, and a capacitor with plates 83 and 30, formed in the first well area;

Art Unit: 2814

a digital circuit, comprising the MOS transistor, the BJT and the capacitor with plates 81 and 30, formed in the second well area; and a first conductivity type low resistance area 220 provided at a base portion of the first well area, the first conductivity type low resistance area having a resistive value lower than that of the first well area.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5, 6, 11, 12, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stolmeijer.

Stolmeijer discloses the claimed invention except for the impurity concentration of the low resistance area. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include these values, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

***Response to Arguments***

5. Applicant's arguments filed on 4/11/03 have been fully considered but they are not persuasive.

Applicant argues that in the Stolmeijer reference the field region 220 is formed by implanting n+ impurities in the well region 230. Applicant further argues that the use of n+ is not consistent. Stolmeijer, applicant alleges, does not disclose a well region has a higher impurity at the bottom thereof, since the reference merely implants impurities into the well regions and this does not indicate the bottom portion of the well regions has higher impurities.

The Office maintains the rejection for the following reasons.

First, and most importantly, the reference in figure 5 defines two separate portions of each of the well regions 130 and 230. These portions are active regions 110 and 210, and field regions 120 and 220. Now, the reference discloses, at column 3, lines 23-30, that the field regions are heavily doped (note that n+ impurities means heavy doping of n-type impurities). Therefore, the fact that the reference has divided the well regions into separate regions, namely the active regions and field regions, and then states that only one of those regions, namely the field regions, are heavily doped implies that the rest of the well regions are not heavily doped. Otherwise, there would be no point to divide the well regions into field regions and active regions, and use different numerical references for those regions. Second, Stolmeijer discloses at column 3, lines 23-29 and 59-67; and column 4, lines 1 and 2, that doped field regions 81-84 are heavily doped. Notice that the regions 81-84 are referred to as field regions and they are heavily doped. Further, it is disclosed in claim 1, column 4, lines 37-39, that the regions between the isolating regions (that is regions 81-84) are more heavily doped than the body region. Clearly, regions 81-84 are more heavily doped than the portions

Art Unit: 2814

of the well regions in which they are placed, that are well regions 130 and 230. in another words, the portions of the well regions, which surround regions 81-84 are lower in impurities than regions 81-84. Otherwise, there would be no point to place these regions into the well regions. Incidentally, regions 81-84 are placed into the well regions in order to suppress the latch-up phenomena (see column 3, the last line; and column 4, line 1). Now, the field regions are heavily doped, the same doping concentration as regions 81-84 (note that, as discussed above, the field regions are n+ and regions 81-84 are n+ also). Since, as discussed above, regions 81-84 are more heavily doped than the portions of the well regions that surround them, or top portions of the well regions, and the field regions have approximately the same doping as regions 81-84, the filed regions (that is the bottom portions of the well regions) are more heavily doped than the top portions of the well regions (which are the regions that surround regions 81-84). If the top portions of the well regions were also heavily doped, as applicant is trying to prove, then all the regions shown in figure 5, namely, the active regions 110 and 210 (the top portions of the well regions), regions 81-84, and the field regions 120 and 220 (that is the bottom portions of the well regions) would have had the same doping concentration. It should be obvious that this is not the case, and the reference, in fact, has different regions in the well regions that are named according to their impurity concentration.

Art Unit: 2814

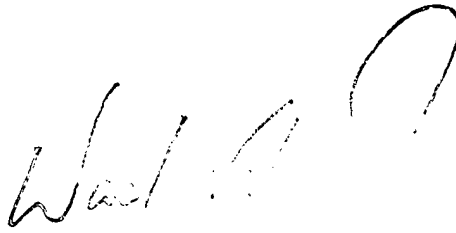
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani  
July 17, 2003

  
SUPERVISORY PRIMER  
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